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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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HEWLETT PACKARD COMPANY
P O BOX 272400, 3404 E. HARMONY ROAD
INTELLECTUAL PROPERTY ADMINISTRATION
FORT COLLINS, CO 80527-2400

EXAMINER

IWASHKO, LEV

ART UNIT PAPER NUMBER

2186

DATE MAILED: 02/14/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 10/759,772	Applicant(s) PATTERSON ET AL.	
	Examiner Lev I. Iwashko	Art Unit 2186	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 14 January 2004.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-26 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-26 is/are rejected.
- 7) ☒ Claim(s) 16, 19-23 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 14 January 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Claim Objections

1. Claim 16 is objected to because of the following informalities: Claim 16 reads as follows: “The storage device of claim 13 wherein the controller tracks conditions that affect job flow other input and output to the processes and performing corrective action.” There seems to be a “than” missing after “other”. Appropriate correction is required.
2. Claims 19-21 are objected to because they all depend on “Claim 27”, which does not appear in the list of claims. It is believed that the inventor meant to have claims 19-21 be dependent on Claim 18, and the application will be treated as such.
3. Claims 22-23 are objected to because they all depend on “Claim 32”, which does not appear in the list of claims. It is believed that the inventor meant to have claims 22-23 be dependent on Claim 21, and the application will be treated as such.

Claim Rejections - 35 USC § 112

4. The following claims show a lack of antecedent basis:

Claims 2 and 4 reference “the RAID storage device”, which has not been defined in a previous claim. There is therefore insufficient antecedent basis for this limitation in the claims.

Claim Rejections - 35 USC § 102

5. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

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6. Claims 1-8, 10-17, and 24-25 are rejected under 35 U.S.C. 102(b) as being anticipated by DeKoning et al. (US Patent 5,974,502).

Claim 1. A storage device comprising: (*Abstract, lines 3 – Declares a RAID system*)

- a controller configured to receive jobs from a source; (*Column 5, lines 24-25 – Declare that the disk array controller receives requests from the host*)
- a set of components that receive, complete, and pass on jobs; (*Column 6, lines 9-17 – Declare that the disk array controller receives and completes requests and then transfers the data between the host and array. The host then delivers the data line*)
- and job flow analysis devices configured to the controller to track the number of jobs received, completed, and passed on by each component, (*Column 6, lines 22-39 – Declare a “request size calculation unit”, a comparator and “RAID controller function unit”*)
- wherein the controller compares the number of jobs received with the sum of the number of jobs completed and passed on by each component. (*Column 7, lines 55-67 and Column 7, lines 1-51 – Declare a “Number of Concurrent Large I/O Pieces” parameter (a.k.a. the sum of the number of jobs completed and passed on) that is tracked and compared by the devices above*)

Claim 2. The storage device of claim 1 wherein the controller is further configured to perform a corrective action on the RAID storage device and request from the source the jobs when the number of jobs received is greater than the sum of a threshold amount plus the number of jobs completed and passed on by one of the components. (*Column 6, lines 47-52 – State the following:” If the*

size of the current I/O request is greater than the LARGE I/O SIZE parameter, the request is delivered to the RDU 60 which, among other things, divides the current I/O request into a plurality of block requests which are each equal to or smaller in size than the LARGE I/O SIZE parameter)

- Claim 3. The storage device of claim 1 wherein the set of components are arranged serially. *(Figure 3, components 42 and 52 – Show how the components are linked serially)*
- Claim 4. The RAID storage device of claim 1 wherein the job flow analysis devices are comprised of job logs to record jobs received, completed, and passed on. *(Column 6, lines 22-36 – Declare RAID controller function units and request size calculation units which log the jobs)*
- Claim 5. A method comprising: *(Column 3, line 25 – Declares a method)*
- determining a number of jobs received, completed, and passed on by a process; *(Column 6, lines 28-32 – Describe the functions of the request size calculation unit)*
 - comparing the number of jobs received by the process and a sum of the number of jobs completed and passed on by the process; *(Column 6, lines 32-35 – Describe the comparator's functions)*
 - deciding whether the sum a threshold amount and of the number of jobs completed and passed on is greater than the number of jobs received; *(Column 6, lines 45-47 – State the following: "If the size of the current I/O request is less than or equal to the LARGE I/O SIZE parameter, than the entire request is delivered to the RCFU 52 for processing")*
 - and performing a corrective action when the sum of the threshold amount and the number of jobs completed and passed versus the number of jobs received is not acceptable. *(Column*

6, lines 47-52 – State the following: " If the size of the current I/O request is greater than the LARGE I/O SIZE parameter, the request is delivered to the RDU 60 which, among other things, divides the current I/O request into a plurality of block requests which are each equal to or smaller in size than the LARGE I/O SIZE parameter)

- Claim 6. The method of claim 5 wherein the comparing is performed over a common time period during which the numbers of jobs are received, completed, and passed on by the process. *(Column 6, lines 55-60 – State that the parameters will all be completed at one time)*
- Claim 7. The method of claim 5 wherein the determining is performed by a counter for the jobs received, a counter for the jobs completed, and a counter for the jobs passed on. *(Column 6, lines 30 – Declares that there is a calculator that sees how many jobs have been done)*
- Claim 8. The method of claim 7 wherein the determining is further comprised of tracking the jobs in job logs included in the counters. *(Column 6, lines 22-36 – Declare RAID controller function units and request size calculation units which log the jobs)*
- Claim 10. The method of claim 5 wherein the performing a corrective action comprises requesting for jobs to be resent from a source. *(Column 8, lines 33-65 – Describe the entire process, including resending the process)*
- Claim 11. The method of claim 5 wherein the process is one of a set of serial processes that receive, complete, and pass on jobs. *(Figure 4 – Shows how the set of processes is done in serial)*
- Claim 12. The method of claim 5 further comprising accounting for any conditions that affect job flow other than input and output to the process and performing corrective action. *(Column 8, lines 38-42 – State the following: "It should be appreciated that in one*

embodiment of the present invention, the length of the period between updates, known as the I/O interval, is another system parameter which may be tuned in the controller 44")

Claim 13. A storage device comprising: *(Abstract, lines 3 – Declares a RAID system)*

- a series of processes configured to count jobs received, completed, and passed on by each process; *(Column 6, lines 9-17 – Declare that the disk array controller receives and completes requests and then transfers the data between the host and array. The host then delivers the data line)*
- a set of counters to track numbers of jobs received, completed, and passed on by each process in the series of processes; *(Column 6, lines 22-36 – Declare RAID controller function units and request size calculation units which keep track of the jobs)*
- and a controller that compares from the counters the number of jobs received versus the sum of the number of jobs completed and passed on by each process. *(Column 5, lines 24-25 – Declare that the disk array controller receives requests from the host. Column 7, lines 55-67 and Column 7, lines 1-51 – Declare a “Number of Concurrent Large I/O Pieces” parameter (a.k.a. the sum of the number of jobs completed and passed on) that is tracked and compared by the devices above)*

Claim 14. The storage device of claim 13 wherein the set of counters are comprised of job logs to record particular jobs received, completed, and passed on at each counter. *(Column 6, lines 22-36 – Declare RAID controller function units and request size calculation units which log the jobs)*

Claim 15. The storage device of claim 13 wherein the jobs are received from a device which communicates with the storage device. *(Column 5,*

lines 24-25 – Declare that the disk array controller receives requests from the host)

Claim 16. The storage device of claim 13 wherein the controller tracks conditions that affect job flow other input and output to the processes and performing corrective action. *(Column 8, lines 38-42 – State the following: “It should be appreciated that in one embodiment of the present invention, the length of the period between updates, known as the I/O interval, is another system parameter which may be tuned in the controller 44”)*

Claim 17. A system that comprises the storage device of claim 13. *(Figure 3 – Shows a system)*

Claim 24. A storage device comprising: *(Abstract, lines 3 – Declares a RAID system)*

- means for counting the number of jobs received, completed, and passed on by processes in a controller of the storage device; *(Column 6, lines 22-36 – Declare RAID controller function units and request size calculation units which log the jobs)*
- means for determining if the number of jobs completed and passed on is sufficient for the number of jobs received by each process; *(Column 7, lines 55-67 and Column 7, lines 1-51 – Declare a “Number of Concurrent Large I/O Pieces” parameter (a.k.a. the sum of the number of jobs completed and passed on) that is tracked and compared by the devices above)*
- means for resetting the processes; *(Column 8, lines 33-36 – State the following: “As mentioned previously, the dynamic feedback tuning approach periodically determines values for a number of feedback variables and uses the variables to update the LARGE I/O SIZE and NCLIOP parameters”)*

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- and means for requesting for the jobs to be resent to the processes. *(Column 8, lines 33-65 – Describe the entire process, including resending the process)*

Claim 25. The storage device of claim 35 wherein the means for counting comprises a job log for jobs received, completed, and passed on by each process. *(Column 6, lines 22-36 – Declare RAID controller function units and request size calculation units which log the jobs)*

Claim Rejections - 35 USC § 103

7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

8. Claims 9 and 26 are rejected under 35 U.S.C.103(a) as being unpatentable over DeKoning as applied to claims 5 and 24 above, further in view of Iida et al. (US Patent 5,166,927).

DeKoning teaches the limitations of claims 5 and 24 for the reasons above.

DeKoning's invention differs from the claimed invention in that there is no specific reference to bandwidth analysis.

DeKoning fails to teach claims 9 and 26, which respectively state “The method of claim 5 wherein the determining comprises performing a bandwidth analysis at an input where the jobs are received, at an output of where the jobs are completed, and at an output of where the jobs are passed on” and “The storage device of claim 35 wherein the means for counting is performed by bandwidth analysis for jobs inputted to, and

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completed and passed on as output by each process.” However, Iida states the following: “Input/output port 59 receives a setting-up packet at S80 and reads the maximum bandwidth from packet analysis unit 76 at S81. The maximum use frequency band is informed to adjacent nodes through bandwidth information communication unit 77 and input/output port 59 at S82, and the maximum bandwidth S.sub.Y assigned to the setting-up packet which is a subject of a routing from one adjacent node to another is received at S83” (Column 22, lines 5-13). Therefore, it would have been obvious to one of ordinary skill in the art to combine the “Apparatus and Method for Analyzing and Modifying Data Transfer Requests in a RAID System” of DeKoning, and Iida’s “Adaptive Pathfinding Neutral Network for a Packet Communication System” to include bandwidth analysis at input and output points in the system so that the entire invention would run more efficiently, accurately, and usefully.

9. Claim 18 is rejected under 35 U.S.C.103(a) as being unpatentable over DeKoning, further in view of Akiba et al. (US Patent 5,459,866).

DeKoning teaches the following limitations of claims 18 for the reasons provided:

- tracking a number of jobs received, jobs completed, and jobs passed on by the process; (*Column 6, lines 22-39 – Declare a “request size calculation unit”, a comparator and “RAID controller function unit”*)
- comparing the number of jobs received by the process with the number of jobs completed and passed on the process; (*Column 7, lines 55-67 and Column 7, lines 1-51 – Declare a “Number of Concurrent Large I/O Pieces” parameter (a.k.a. the sum of the number of jobs completed and passed on) that is tracked and compared by the devices above*)

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- and determining a discrepancy whenever the number of jobs received by the process exceeds the number of jobs completed and passed on the process.

(Column 6, lines 45-47 – State the following: “If the size of the current I/O request is less than or equal to the LARGE I/O SIZE parameter, than the entire request is delivered to the RCFU 52 for processing”. Column 6, lines 47-52 – State the following:” If the size of the current I/O request is greater than the LARGE I/O SIZE parameter, the request is delivered to the RDU 60 which, among other things, divides the current I/O request into a plurality of block requests which are each equal to or smaller in size than the LARGE I/O SIZE parameter)

DeKoning's invention differs from the claimed invention in that there is no specific reference to instructions to be utilized by the processor.

DeKoning fails to teach the following limitation of claim 18, which states “A processor-readable medium comprising processor-executable instructions for analyzing job flow in a process, the processor-executable instructions comprising instructions for:”. However, Akiba states the following: ““In a support system for software development implemented on a computer, a file input/output distinction related to a utility whose program can not be analyzed is preliminarily registered in the support system, job control language which is the subject of automatic production of a job flow specification is input, the job control language and a source program are analyzed and basic job flow information is produced. A job flow specification is automatically produced by deriving a file input/output distinction from a load module name in the input job control language and one of source program analysis information corresponding thereto, utility

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information and job control language analysis information” (Abstract, lines 1-13).

Therefore, it would have been obvious to one of ordinary skill in the art to combine the “Apparatus and Method for Analyzing and Modifying Data Transfer Requests in a RAID System” of DeKoning, and Akiba’s “Method of Automatically Producing Job Flow Specification” to include code so that the system would be more universally usable, and easier to modify.

10. Claims 19-23 are rejected under 35 U.S.C.103(a) as being unpatentable over DeKoning, further in view of Akiba et al. (US Patent 5,459,866).

DeKoning teaches the following limitations of claims 19-23 for the reasons provided:

- Claim 19. The processor-readable medium of claim 27 wherein the tracking is performed for an expected amount of time for which the jobs are to be completed. *(Column 6, lines 55-60 – State that the parameters will all be completed at one time)*
- Claim 20. The processor-readable medium of claim 27 wherein the process is part of a set of serial processes. *(Figure 4 – Shows how the set of processes is done in serial)*
- Claim 21. The processor-readable medium of claim 27 wherein the instructions further comprise performing a corrective action when the process when a discrepancy is determined. *(Column 6, lines 45-47 – State the following: “If the size of the current I/O request is less than or equal to the LARGE I/O SIZE parameter, than the entire request is delivered to the RCFU 52 for processing”. Column 6, lines 47-52 – State the following: “ If the size*

of the current I/O request is greater than the LARGE I/O SIZE parameter, the request is delivered to the RDU 60 which, among other things, divides the current I/O request into a plurality of block requests which are each equal to or smaller in size than the LARGE I/O SIZE parameter)

- Claim 22. The processor-readable medium of claim 32 further comprising requesting for a complete set of jobs to be received when performing the corrective action on the process. *(Column 7, lines 27-36 – State the following: “Initially, the microprocessor will load data into the buffer 68 corresponding to the first X block requests and will begin to process the data. When the processing of the data corresponding to one of the X block requests is completed, the microprocessor 62 will load data into the buffer 68 corresponding to the next block request and will begin to process that data. The result of this is that the total number of block requests which are active, or are becoming active, in the RCFU 52 is constant until the full I/O request is near completion”)*
- Claim 23. The processor-readable medium of claim 32 further comprising requesting for jobs awaiting to be processed when the corrective action is performed. *(Column 8, lines 36-38 – State the following: “During the period between updates, the RCFU 52 processes the current block requests using the current values of the parameters”)*

DeKoning's invention differs from the claimed invention in that there is no specific reference to instructions to be utilized by the processor.

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DeKoning fails to teach the following limitation of claims 19-23, which are based on the independent claim 18 which states “A processor-readable medium comprising processor-executable instructions for analyzing job flow in a process, the processor-executable instructions comprising instructions for:”. However, Akiba states the following: ““In a support system for software development implemented on a computer, a file input/output distinction related to a utility whose program can not be analyzed is preliminarily registered in the support system, job control language which is the subject of automatic production of a job flow specification is input, the job control language and a source program are analyzed and basic job flow information is produced. A job flow specification is automatically produced by deriving a file input/output distinction from a load module name in the input job control language and one of source program analysis information corresponding thereto, utility information and job control language analysis information” (Abstract, lines 1-13). Therefore, it would have been obvious to one of ordinary skill in the art to combine the “Apparatus and Method for Analyzing and Modifying Data Transfer Requests in a RAID System” of DeKoning, and Akiba’s “Method of Automatically Producing Job Flow Specification” to include code so that the system would be more universally usable, and easier to modify.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Lev I. Iwashko whose telephone number is (571)272-1658. The examiner can normally be reached on M-F (alternating Fridays), from 8-4PM.

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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Matt Kim can be reached on (571)272-4182. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



Lev Iwashko



MATTHEW D. ANDERSON
PRIMARY EXAMINER